TABLE 54.01–1(A)—LIMITATIONS AND MODIFICATIONS IN THE ADOPTION OF DIVISION 1 OF SECTION VIII, ASME CODE—Continued

| Paragraphs in Section VIII, ASME Code[1] and disposition | Unit of this part |
|---|---|
| UB–1 modified by | 54.23–1 |
| UB–2 modified by | 52.01–95(d) and 56.30–30(b)(1). |
| UCS–6 modified by | 54.25–3. |
| UCS–25 replaced by | 54.25–5. |
| UCS–56 modified by | 54.25–7. |
| UCS–57, UNF–57, UHA–33, and UHT–57 modified by. | 54.25–8. |
| UCS–65 through UCS–67 replaced by. | 54.25–10. |
| UHA–23(b) and UHA–51 modified by. | 54.25–15. |
| UHT–5(c), UHT–6, UHT–23 modified by. | 54.25–20. |
| UHT–82 modified by | 54.25–20, 54.25–25. |
| UA–60 modified by | 54.15–3. |

[1] The references to specific provisions in the ASME Code are coded. The first letter ''U'' refers to division 1 of section VIII. The second letter, such as ''G'', refers to a subsection within section VIII. The number refers to the paragraph within the subsection.

(b) References to the ASME Code, such as paragraph UG–125, indicate:

U=Division 1 of section VIII, Pressure Vessels, ASME Code.
G=Part containing general requirements.
125=Paragraph within part.

(c) When a paragraph or a section of the regulations in this part relates to material in division 1 of section VIII of the ASME Code, the relationship with the code will be shown immediately following the heading of the section or at the beginning of the paragraph as follows:

(1) (Modifies U_____.) This indicates that the material in U_____ is generally applicable but is being altered, amplified or augmented.

(2) (Replaces U_____.) This indicates that U_____ does not apply.

(3) (Reproduces U_____.) This indicates that U_____ is being identically reproduced for convenience, not for emphasis.

[CGFR 68–82, 33 FR 18828, Dec. 18, 1968, as amended by CGFR 69–127, 35 FR 9976, June 17, 1970; CGFR 72–59R, 37 FR 6188, Mar. 25, 1972; CGD 72–206R, 38 FR 17226, June 29, 1973; CGD 73–254, 40 FR 40163, Sept. 2, 1975; CGD 77–147, 47 FR 21809, May 20, 1982; CGD 85–061, 54 FR 50963, Dec. 11, 1989. Redesignated by CGD 88–032, 56 FR 35822, July 29, 1991]

### §54.01–5 Scope (modifies U–1 and U–2).

(a) This part contains requirements for pressure vessels. Table 54.01–5(a) gives a breakdown by parts in this subchapter of the regulations governing various types of pressure vessels, boilers, and thermal units.

(b) Pressure vessels are divided into Classes I, I–L (low temperature), II, II–L (low temperature), and III. Table 54.01–5(b) describes these classes and sets out additional requirements for welded pressure vessels.

(c) The requirements for pressure vessels by class are as follows:

(1) Class I–L and II–L pressure vessels must meet the applicable requirements in this part.

(2) Pressure vessels containing hazardous materials as defined in §150.115 of this chapter must meet the requirements of this part or, as applicable, the requirements in 49 CFR parts 171–177 or part 64 of this chapter.

(3) Except as provided in paragraph (c)(4) of this section, Classes I, II, and III pressure vessels not containing hazardous materials must be designed and constructed in accordance with the requirements in Section VIII, division 1, of the ASME Code and must be stamped with the ASME ''U'' symbol. These pressure vessels must also comply with the requirements that are listed or prescribed in paragraphs (d) through (g) of this section. Compliance with other provisions in this part is not required.

(4) Classes II and III pressure vessels that have a net internal volume of less than 0.14 cubic meters (5 cubic feet) and do not contain hazardous materials must be stamped with either the ASME ''U'' or ''UM'' symbol. Compliance with other provisions in this part is not required.

(d) Pressure vessels described in paragraph (c)(3) of this section must—

(1) Have detailed plans that include the information required by §54.01–18 (approved by the Office of Management and Budget under OMB control number 2130–0181);

(2) Meet §54.01–35, §54.20–3(c), and §54.25–3 of this part;

(3) Have pressure relief devices required by subpart 54.15;

(4) Meet the applicable requirements in §§54.10–3, 54.10–20, and 54.10–25 for inspection, reports, and stamping;

(5) If welded, meet the post weld heat treatment and minimum joint and radiography requirement in Table 54.01–5(b); and

(6) If a steam generating pressure vessel, meet § 54.01–10.

(e) The plans required by paragraph (d)(1) of this section must be certified by a registered professional engineer to meet the design requirements in paragraph (d) of this section and in section VIII, division 1, of the ASME Code. The certification must appear on all drawings and analyses. The plans must be made available to the Coast Guard prior to the inspection required by § 54.10–3(c).

(f) If a pressure vessel has more than one independent chamber and the chambers have different classifications, each chamber must, as a minimum, meet the requirements for its classification. If a single classification for the entire pressure vessel is preferred, the classification selected must be one that is required to meet all of the regulations applicable to the classification that is not selected. For example, if one chamber is Class I and one chamber is Class II–L, the only single classification that can be selected is Class I–L.

(g) The design pressure for each interface between two chambers in a multichambered pressure vessel must be—

(1) The maximum allowable working pressure (gauge) in the chamber with the higher pressure; or

(2) If one chamber is a vacuum chamber, the maximum allowable working pressure (absolute) in the other chamber minus the least operating pressure (absolute) in the vacuum chamber.

TABLE 54.01–5(a)—REGULATION REFERENCE FOR BOILERS, PRESSURE VESSELS, AND THERMAL UNITS

| Service and pressure temperature boundaries | Part of subchapter regulating mechanical design | Part of subchapter regulating automatic control |
|---|---|---|
| Main (power) boiler: All | 52 | 62 |
| Pressure vessel: All | 54 | NA |
| Fired auxiliary boiler [1] (combustion products or electricity): | | |
| (a) Steam: | | |
| More than 103 kPa (15 psig) | 52 | [2] 62 or 63 |
| Equal to or less than 103 kPa (15 psig) | 53 | 63 |
| (b) Hot water heating: | | |
| More than 689 kPa (100 psig) or 121 °C (250 °F) | 52 | 63 |
| Equal to or less than 689 kPa (100 psig) and 121 °C (250 °F) | 53 | 63 |
| (c) Hot water supply: | | |
| More than 689 kPa (100 psig) or 121 °C (250 °F) | 52 | 63 |
| Equal to or less than 689 kPa (100 psig) and 121 °C (250 °F) | 53 | 63 |
| Other: | | |
| (a) Fired thermal fluid heaters: All | 52 | 63 |
| (b) Unfired steam boiler: | | |
| More than 206 kPa (30 psig) or 454 °C (850 °F) [3] | 52 | NA |
| Equal to or less than 206 kPa (30 psig) and 454 °C (850 °F) | 54 | NA |
| (c) Evaporators and heat exchangers: More than 103 kPa (15 psig) [4] | 54 | NA |
| (d) Unfired hot water supply or heating boiler: More than 103 kPa (15 psig) [4] | 54 | NA |

[1] Including exhaust gas types.

[2] Boilers with heat input ratings >=12,500,000 Btu/hr. must have controls that meet part 62. Boilers with heat input ratings <12,500,000 Btu/hr. must have controls that meet part 63.

[3] Temperature of working fluid.

[4] Relief device is required even if designed for less than 103 kPa (15 psig).

TABLE 54.01–5(b)—PRESSURE VESSEL CLASSIFICATION

| Class | Service contents | Class limits on pressure and temperature | Joint requirements [1,6,7] | Radiography requirements, section VIII, ASME Code [3,7] | Post weld heat treatment required [5,7] | Shop inspect. required | Plan approval required |
|---|---|---|---|---|---|---|---|
| I | (a) Vapor or gas<br>(b) Liquid<br>(c) Hazardous materials [2]. | Over 600 p.s.i. or 700 °F<br>Over 600 p.s.i. or 400 °F | (1) For category A; (1) or (2) For category B. All categories C and D must have full penetration welds extending through the entire thickness of the vessel wall or nozzle wall. | Full on all butt joints regardless of thickness. Exceptions listed in Table UCS–57 of ASME Code do not apply. | For carbon or low alloy steel, in accordance with Table UCS–56, regardless of thickness. For other materials, in accordance with section VIII, ASME Code. | Yes [4] | Yes [4]. |
| I–L Low temperature. | (a) Vapor or gas<br>(b) Liquid<br>(c) Hazardous materials [2] | Over 250 p.s.i. and service temperature below 0 °F<br>Over 250 p.s.i. and service temperature below 0 °F | (1) for categories A and B. All categories C and D must have full penetration welds extending through the entire thickness of the vessel wall or nozzle wall. No backing rings or strips left in place. | Full on all butt joints regardless of thickness. Exceptions listed in Table UCS–57 of ASME Code do not apply. | For carbon or low alloy steel, in accordance with Table UCS–56, regardless of thickness. For other materials, in accordance with section VIII, ASME Code. | Yes | Yes. |
| II | (a) Vapor or gas<br>(b) Liquid<br>(c) Hazardous materials [2,3,6] | 30 through 600 p.s.i. or 275° through 700 °F<br>200 through 600 p.s.i. or 250° through 400 °F | (1) or (2) for category A. (1), (2), or (3) for category B. Categories C and D in accordance with UW–16 of ASME Code. | Spot, unless exempted by UW–11(c) of ASME Code. | In accordance with section, VIII of ASME Code. | Yes [4] | Yes [4]. |
| II–L Low temperature. | (a) Vapor or gas<br>(b) Liquid<br>(c) Hazardous materials [2] | 0 through 250 p.s.i. and service temperature below 0 °F<br>0 through 250 p.s.i. and service temperature below 0 °F | (1) for category A; (1) or (2) for category B. All categories C and D must have full penetration welds extending through the entire thickness of the vessel wall or nozzle wall. | Spot. The exemption of UW–II(c) of ASME Code does not apply. | Same as for I–L except that mechanical stress relief may be substituted if allowed under subpart 54.30 of this chapter. | Yes | Yes. |
| III | (a) Vapor or gas<br>(b) Liquid<br>(c) Hazardous materials [2,3,6] | Under 30 p.s.i. and 0° through 275 °F<br>Under 200 p.s.i. and 0° through 250 °F | In accordance with Section VIII of AMSE Code. | Spot, unless exempted UW–II(c) of ASME Code. | In accordance with Section VIII of ASME Code. | Yes [4]. | Yes [4]. |

[1] Welded joint categories are defined under UW–3 of the ASME Code. Joint types are described in Table UW–12 of the ASME Code, and numbered "(1)," "(2)", etc.
[2] See § 54.20–2.
[3] See §§ 54.25–8(c) and 54.25–10(d).
[4] See §§ 54.01–15 and 54.10–3 for exemptions.
[5] Specific requirements modifying Table UCS–56 of the ASME Code are found in § 54.25–7.
[6] See § 54.20–3 (c) and (f)
[7] Applies only to welded pressure vessels.

(Approved by the Office of Management and Budget under OMB control number 2130–0181)

[CGFR 68–82, 33 FR 18828, Dec. 18, 1968, as amended by CGFR 69–127, 35 FR 9976, June 17, 1970; CGD 77–147, 47 FR 21809, May 20, 1982; 55 FR 696, Jan. 8, 1990; CGD 88–057, 55 FR 24236, June 15, 1990; CGD 85–061, 55 FR 41917, Oct. 16, 1990; CGD 95–027, 61 FR 26000, May 23, 1996; USCG–2000–7790, 65 FR 58460, Sept. 29, 2000]

### § 54.01–10 Steam generating pressure vessels (modifies U–1(e)).

(a) Pressure vessels in which steam is generated are classed as ''Unfired Steam Boilers'' except as required otherwise by paragraph (b) of this section. Unfired steam boilers must be fitted with an efficient water level indicator, a pressure gage, a blowdown valve, and an approved safety valve as required by §54.15–15. Unfired steam boilers must be constructed in accordance with this part other than when the pressures are more than 206 kPa (30 psig) or the temperatures of the working fluid are more than 454 °C (850 °F) when such boilers must be constructed in accordance with part 52 of this subchapter.

(b) Vessels known as ''Evaporators'' or ''Heat Exchangers'' are not classified as unfired steam boilers. They shall be fitted with an approved safety device as required under §54.15–15 and constructed in accordance with this part.

(c) An evaporator in which steam is generated shall be fitted with an efficient water level indicator, a pressure gage, and a blowdown valve.

[CGFR 68–82, 33 FR 18828, Dec. 18, 1968, as amended by CGD 81–79, 50 FR 9436, Mar. 8, 1985; CGD 95–012, 60 FR 48044, Sept. 18, 1995]

### § 54.01–15 Exemptions from shop inspection and plan approval (replaces U–1(c) (6) through (9)).

(a) The following classifications are exempt from shop inspection and plan approval requirements of this part:

(1) Vessels containing water at a pressure not greater than 100 pounds per square inch gage, nor a temperature above 200 °F., including those containing air, the compression of which serves only as a cushion. Air charging lines may be permanently attached provided the air pressure does not exceed 15 pounds per square inch gage.

(2) Hot water supply storage tanks heated by steam or any other indirect means when none of the following limitations is exceeded:

(i) A heat input of 200,000 B.t.u. per hour;

(ii) A water temperature of 200 °F.;

(iii) A nominal water-containing capacity of 120 gallons; or

(iv) A pressure of 100 pounds per square inch gage.

The exemption of any tank under this subparagraph requires that it shall be fitted with a safety relief valve of at least 1-inch diameter, set to relieve below the maximum allowable working pressure of the tank.

(3)(i) Vessels having an internal operating pressure not exceeding 15 pounds per square inch gage with no limitation on size. (See UG–28(e) of the ASME Code.)

(ii) Cargo tanks of pressure vessel configuration are not included in the exemption in paragraph (a)(3)(i) of this section.

(4) Class I, II, and III pressure vessels that meet the requirements of §54.01–5 (c)(3) and (c)(4).

(5) Condensers and heat exchangers, regardless of size, where the design is such that the liquid phase is not greater than 100 pounds per square inch gage and 200 °F. and the vapor phase is not greater than 15 pounds per square inch gage provided system over pressure conditions are considered.

(b) For fluid conditioner fittings see §56.15–1 of this subchapter.

[CGFR 68–82, 33 FR 18828, Dec. 18, 1968, as amended by CGFR 69–127, 35 FR 9977, June 17, 1970; CGFR 70–143, 35 FR 19906, Dec. 30, 1970; CGD 77–147, 47 FR 21810, May 20, 1982]

### § 54.01–17 Pressure vessel for human occupancy (PVHO).

Pressure vessels for human occupancy (PVHO's) must meet the requirements of subpart B (Commercial Diving Operations) of part 197 of this chapter.

[CGD 76–009, 43 FR 53683, Nov. 16, 1978]